

SYSTEM AND METHOD OF MEASURING AND CONTROLLING
TEMPERATURE OF OPTICAL FIBER TIP IN A LASER SYSTEM

ABSTRACT OF THE DISCLOSURE

A system and method of sensing temperature at an optical fiber tip, including
5 the steps of positioning a slug of fluorescent material adjacent the optical fiber tip,
providing an optical stimulus having a wavelength within a first predetermined range
through at least one fiber optically linked to the optical fiber tip, wherein a desired
optical fluorescent response having a wavelength within a second predetermined
range from the fluorescent slug is generated, detecting a signal representative of the
10 optical stimulus, detecting a signal representative of the optical fluorescent response,
digitally processing the optical stimulus signal and the optical fluorescent response
signal to determine a phase difference therebetween, and calculating a temperature for
the optical fiber tip as a function of the phase difference. The phase difference
between the optical stimulus signal and the optical fluorescent response signal may be
15 determined directly or indirectly as a function of the phase difference between a
reference signal and the optical stimulus signal and the phase difference between the
reference signal and the optical fluorescent response signal.